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ANTI-BALLISTIC MISSILE TREATY:

IS IT STILL RELEVANT?

A PRIMER ON THE SYSTEMS AND ISSUES

by

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Contents

	<i>Page</i>
DISCLAIMER	II
ILLUSTRATIONS	IV
ABSTRACT.....	V
INTRODUCTION	1
Background.....	2
Current Systems.....	3
THREAT ASSESSMENTS	7
CURRENT SYSTEM EFFECTIVENESS	13
THE CONTROVERSY	20
The Lawyers	20
The Pentagon	21
The Congress	22
The Russians.....	24
The President	26
CONCLUSIONS.....	29
APPENDIX A BALLISTIC MISSILE-CAPABLE COUNTRIES	34
GLOSSARY	37
BIBLIOGRAPHY	38

Illustrations

	<i>Page</i>
Figure 1. Minuteman Missile Launch.....	1
Figure 2. PAVE PAWS radar site.....	7
Figure 3. Deploying Patriot Missile System.....	13
Figure 4. Missile Launch.....	20
Figure 5. Nuclear “Mushroom” Cloud.....	29

Abstract

The relevance of the 1972 Anti-Ballistic Missile Treaty, originally between the United States and the Union of Soviet Socialist Republics, is called increasingly into question as we transition to the Strategic Arms Reduction Treaty (START) III and beyond. In 1997, President William Clinton completed his diplomatic discussions with the nuclear-capable successor states, *in toto* Ukraine, Belarus, Kazakhstan, and Russia, which mandated continuation of the pertinent treaty provisions. Opponents of the treaty objected, stating such a devolution must be ratified by the Senate in order to be binding. Others make little of the issue, satisfied with the agreement in place, which in fact accomplishes the goals of the original agreement with the Soviet Union. Furthermore, there is debate not only on the validity of the basic document, but whether or not the US should continue to be a party to it even if valid due to the extent that it prohibits national missile defense activities.

The debate continued as the United States tested and successfully deployed theater ballistic missile defense measures. Many hawks sought to deny the ABM treaty and deploy a strategic anti-ballistic missile program due to a perceived increase in the threat from rogue ballistic missile threats. Such a defensive program is forbidden under the current ABM treaty. Another objection concerned the fact that the current treaty holds both (all) parties to a single ballistic missile defense site. However, due to the geographic expanse of the United States, it is unlikely that a system for which we currently have the

technology can cover the continental United States as well as Alaska and Hawaii. Many legislators and opponents of the ABM treaty are unwilling to allow part of the United States to be naked to the perceived threats because it gives preferential treatment to residents of the continental United States.

Review of the discussions, concerns, technologies, and increasing threats leads to the conclusion that, although at least one legal study dismissed the ABM treaty as a legal nullity, it is still in the United States' best interests to continue with compliance, which it can realistically do while considering the fuller problems of a workable strategic defense plan, the actual legal status of the treaty, and the nature of the threats in the new century. In fact, although Russia dismissed US attempts to modify the treaty to a form which might allow the US to cover all of its territory from small strategic ballistic missile threats (yet be unable to counter the large-scale attacks possible from the USSR successor states). Proponents of the treaty suggested a multilateral information sharing process by which technology might be shared among the parties to enable each to ensure safety from rogue states. As long as there are rogue states, there is a need for such defense; also, the large nuclear powers remain so despite the political upheavals of the past decade.

It has become increasingly apparent that a threat will surface, if not today, or within the next ten years, then certainly in the future. We have no systems capable of dealing with such a threat. The ABM treaty has not significantly affected our abilities in the field, and it is still valid from a political perspective in our relations with former USSR countries, no matter its technical legal validity. As an exercise of good faith and post-Cold-War openness, the treaty is necessary to the accomplishment of related goals in the area such as the START II and III agreements. In addition, the United States' published

interpretation of the current ABM treaty and modifications indicate our current self-preservation efforts have been affected only semantically. Preservation of the treaty is necessary to accomplish important national interests until such time as the necessity to field a strategic anti-ballistic missile defense equals our technology and real ability to do so.

Chapter 1

Introduction



Figure 1. Minuteman Missile Launch.

As we transition to START III and beyond, the relevance of the Anti-Ballistic Missile treaty is being continually reassessed in view of the changing world situation.

The question of the treaty's relevance is of seminal importance in today's world, for the treaty was originally drafted, signed, and ratified by the US and USSR in the Cold War world as an element of deterrence. It banned national defenses against strategic

ballistic missiles “by preventing an expensive and dangerous race between defense and offense, thus providing the essential foundation for negotiated limits on offensive strategic arms.”¹

Background

The treaty as originally drafted in 1972 allowed each nation two 100-interceptor ABM sites for deploying a national defensive system.² The treaty was later modified to permit a state to choose one site,³ either to protect a missile field or to protect the national capital. Russia’s system remains in working order and is located outside of Moscow; the United States chose to implement the system near Grand Forks AFB in South Dakota. However, the United States later abandoned the system due to the expense.⁴ Russia continued its research and today maintains a working defensive system.

The Cold War threat dissipated with the dissolution of the Soviet Union. The United States must adapt to the changing world circumstances, with a reduced bi-polar nuclear threat, but with an increased threat from terrorists and rogue nations with weapons of mass destruction or active programs to obtain them.⁵ The dissolution of the Soviet Union has added another danger: a handful of separate states, some of which maintain the former Union’s nuclear capabilities.⁶ Far from the peace and stability one might expect from such a dissolution, the threats have mutated but are equally dangerous. For instance, due to the continuing economic stress, there is a serious and immediate concern not only that some of the warheads were “misplaced” during the Soviet breakup,⁷ but also that nuclear material and weapons systems and technology might be for sale on the international market.⁸ Additionally, due to the confusion ensuing after the breakup,

maintenance and training technologies were also broken, and the risk of an accidental launch may have proportionally increased with the regional instability.

Thus, the ABM treaty is the subject of great debate—in fact, it always has been—but more so now that the public is somewhat aware of the new enemies, the terrorist threats, and unstable political situation. Yet the ABM treaty prevents a national missile defense system of a type capable of defending all 50 states.⁹

Indian researcher Kalpana Chittaranjan provides an excellent explanation of the situation prior to the New York summit between Presidents Clinton and Yeltsin in September 1997. “The treaty contained detailed provisions designed to prevent either side from gaining the capability to “break out” from its limitations and deploying a nationwide defence [sic]. Strict limits were placed on the deployment of large phased-array radars. . .ABM radars could only be deployed at the single permitted site or at agreed ABM test ranges, and new early-warning radars could only be constructed along the periphery of the country and oriented outward. . . the development, testing, and deployment of all sea-based, air-based, space-based, and mobile land-based ABM systems and components was banned. Only research on mobile systems and components could be conducted. . .this ban applied equally to both traditional-technology ABMs, such as interceptor missiles and radars, and those based on “other physical principles” such as lasers and particle beams.”¹⁰

Current Systems

However, with a perception of differing kinds of threats, the definition of “strategic ballistic missile” was updated, allowing current “theater missile defense” programs to go forward. In September, 1997, Presidents Clinton and Yeltsin agreed that the USA and

Russia would be allowed to test high-velocity TMD systems at speeds not more than 3km/second against ballistic missile targets with velocities not greater than 5km/second or ranges exceeding 3,500 km (the “September Agreements”).¹¹ This results in a loophole which suggests higher-speed systems that obey that test limit may be permitted.¹² Both parties are still prohibited from developing, testing, or deploying space-based TMD interceptors. Notwithstanding this, the agreements exempted the majority of the US’s current six TMD programs¹³ from ABM Treaty violation by accepting the US’ compliance certification,¹⁴ while the Medium Extended Air Defense System (MEADS) mobile ground-based system and the Air Force’s Airborne Laser (ABL) system are not anticipated to cause treaty violation problems.¹⁵ None of the systems has yet been successfully tested against any ballistic missile, and all need substantial work before they are field-ready.

However, as George Lewis and He Yingbo, of the Massachusetts Institute of Technology and the China Academy of Engineering Physics, respectively, point out, the TMD distinctions may be completely irrelevant to the arguments concerning a national strategic missile defense program. They note that a TMD system “can lack strategic-capability either because it has a very low kill probability against a strategic target” or because the area it can defend is impossibly small to provide meaningful coverage.¹⁶ However, current “ABMT approved” systems (THAAD and Navy Theater-Wide) are capable of defending large areas from missiles with ranges up to 3,500 km. Lewis and Yingbo note that the only intrinsic difference between such a missile and a larger range strategic missile is the missile speed: roughly 7km/sec strategic, versus 5km/sec theater.¹⁷ If a TMD system is sufficiently reliable and accurate, Lewis and Yingbo opine that the

kill probability would not be adversely affected—thus, of course, the so-called “TMD” systems would be easily adaptable to provide protection from longer-range missiles.¹⁸

In fact, despite the United States’ concern with being bound to the treaty, such inconsistencies abound. The official position of the United States is that not only are all of the currently planned systems (noted, *supra*) legal, but also that there are no velocity limits on TMD interceptors. Other than the test speed limit, there are few restrictions on testing and deployment of “TMD” systems.¹⁹ The US interpretation of the current agreement enables US interests to be served while preserving its interest in deterrence and cooperation with the former Soviet Union.

Notes

¹ Kalpana Chittaranjan, “ABM treaty and US NMD”, paper to the International Defence Security Association, (May 1985).

² Peter D. Zimmerman, “Missile Defense and American Security: A Sensible National Policy”, *Defense Working Paper No. 2*, (May 1996), p.6.

³ Ibid.

⁴ See Note 1, *supra*.

⁵ R. James Woolsey, “Ballistic Missile Defense, Testimony before the House Government Reform and Oversight Subcommittee on National Security”, 30 May 1996

⁶ David B. Rivkin, Jr., Lee A. Casey, and, Darin R. Bartram, “The Collapse of the Soviet Union and the End of the 1972 Anti-Ballistic Missile Treaty, Executive Summary”, a memorandum of law, prepared for the Heritage Foundation (15 Jun 98); see also Treaty Between the United States Of America and the Russian Federation on Further Reduction and Limitation of Strategic Offensive Arms (START I), July 1, 1991 and protocols.

⁷ Curt Weldon, “Why We Must Act at Once”. *Orbis* 40:63-69 (Winter 1996).

⁸ Bill Heiser. “The Defense Counterproliferation Initiative,” *Physics and Society* (Oct 94).

⁹ Treaty Between the United States of America and the Union of Soviet Socialist Republics on the Limitation of Anti-Ballistic Missile Systems (ABM Treaty)

¹⁰ Kalpana Chittaranjan, “The ABM Treaty and US NMD”, (1995), p. 2

¹¹ First and Second Agreed Statements of September 26, 1997, Relating to the ABM Treaty.

¹² Kalpana Chittaranjan, “The ABM Treaty and US NMD (1995) p 6.

¹³ The Army’s Patriot Advanced Capability-3 (PAC-3); the Theater High-Altitude Area Defense (THAAD); the Navy Area Defense; and the Navy Theater-Wide Defense (upper-tier shipborne defense)

Notes

¹⁴ First Agreed Statement of September 26, 1997, Relating to the ABM Treaty.

¹⁵ Pat Towell, "Anti-Missile Defense: Supersonic Duel With Almost No Room for Mistakes", *Congressional Quarterly*, May 19 1997. Both of these systems are theater defenses; in addition, the ABL system is currently being developed with a one-at-a-time kill capability.

¹⁶ George Lewis and He Yingbo, "U.S. Missile Defense Activities and the Future of the ABM Treaty", Proceedings of the USPID-VII International Castiglioncello Conference on Nuclear and Conventional Disarmament: Progress or Stalemate?, 1997; available at <http://twilight.dsi.unimi.it/~uspid/Cast97/Atti/lewis.html>.

¹⁷ Ibid., p.Taeo 3.

¹⁸ Ibid., p. 4.

¹⁹ Ibid., p.3.

Chapter 2

Threat Assessments

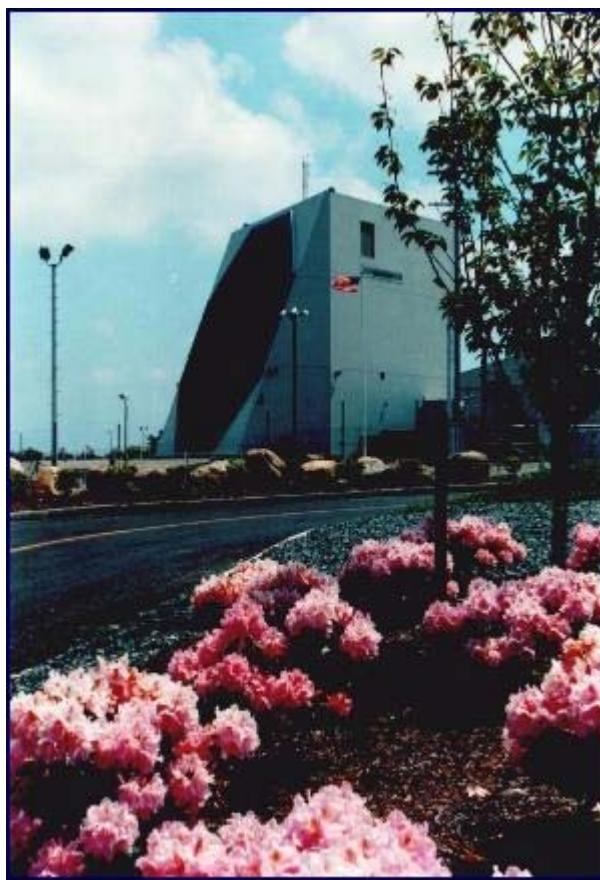


Figure 2. PAVE PAWS radar site.

Missile threats facing the United States no longer come from our historical nemesis. Instead, they have expanded to include a variety of new mechanisms, whether newly developed missiles by a rogue state such as North Korea's No Dong and Taepo Dong missiles; purchased or stolen warheads by terrorist sympathizers such as Sheik Bin

Laden; or accidental launch threats in the wake of Soviet collapse. Former Soviet Defense Minister Igor Rodionov warned that Russia's nuclear forces were becoming "dangerously unmanageable." This threat is multiplied by the fact that the nuclear forces are split among several of the breakaway republics.¹

A 1996 GAO report found that the 1995 National Intelligence Estimate (NIE) was impermissibly vague. The NIE did not specify assumptions about payload weights or weights used in forecasting the range for North Korea's Taepo Dong 2 ballistic missile, which the National Intelligence Community (IC) admitted may be able to reach Alaska, some US Pacific territories, and the outer portion of the Hawaiian island chain.² In addition, the IC judged that the range of an "existing intermediate range ballistic missile could be increased by 90 percent, if it decreased its payload weight by 70 percent."³ Thus, the countries which currently have insufficient capabilities to reach the United States may adjust the range of a given missile by adjusting the payload; for instance, replacing nuclear warheads with biological or chemical ones. The National Intelligence Estimate reviewed by the GAO stated with certainty that "No country, other than the major declared nuclear powers, will develop or otherwise acquire a ballistic missile in the next 15 years that could threaten the contiguous 48 states or Canada." The GAO disagreed, and found that this assurance was overstated.⁴ The North Korean No Dong 1000km missile and the Pakistani 1500km Ghauri missile give the lie to the confidence expressed in the GAO-criticized NIE report. In addition, India's intention to renew testing of the 2000km Agni missile is a potential political and military threat⁵ Certainly, the technologies are available in the world, and when available in the world, will be available in the world market as well. Although it is unlikely that an entire ICBM with

all of its support equipment could be obtained on the black market, it is sobering to realize that in November of 1995, Jordanian officials seized sophisticated missile guidance systems from dismantled Soviet ICBMs on their way to Iraq.⁶ One month later, similar components were discovered in the Tigris River by United Nations inspectors.⁷ Obviously, there is a market and there is available technology. In addition, the idea that a country can quietly test an intermediate or long range missile is not far-fetched. Many of the Arab nations unfriendly to the US have adequate resources and security to do so. The possibility of such technology being developed on the sly is emphasized by the surprise with which the US intelligence community greeted the fact of Pakistan's recently demonstrated nuclear capabilities. In addition, the recent US air strikes on terrorist facilities funded by Sheik Bin Ladin might well indicate that terrorist groups can be adequately funded to be dangerous in unforeseen ways. Complacence should not prevent the United States from taking adequate protective measures.

Official statements by the nations who watch as the United States arranges world affairs, and who feel a good deal of resentment for this, compound recent events. After North Korean No Dong missile tests, a representative of the North Korean Army remarked that the United States was bringing them "to the brink of war" and threatened retaliation.⁸ In addition, North Korea is attempting to sell this shorter-range missile to any nation willing to pay the price—which may well include Iraq, Syria, Iran, and Libya.⁹ Senator Jesse Helms remarked in discussions concerning the National Missile Defense Act amendments of 1997 the concern that adjustment of weapons and payloads could greatly impact the missile range, and noted that the press had reported that the Taepo Dong 2 could reach 6,200 miles. He also pointed out that the South Korean press

reported Russian sources as believing that with improvement of its current systems, the Taepo Dong II could reach over 9,600 km—enough to reach Denver or Minneapolis.¹⁰

One thing appears evident in the United States' intelligence estimates: it recognizes a shorter range threat, but apparently fails to notice that many other countries seek the same voice, or a greater voice, in world affairs. Just as the USSR, and now its successor states, are suspicious of US motives, so too are other nations. The deterrence game the US has been playing with the USSR for the last fifty years is now open to any number of players. As one commentator states in considering planning and options for security strategy and missile defense: "From their perspective, what do they want to be able to do vis-à-vis the United States? How could they deter or dissuade the United States from attacking them or threatening what they consider to be their interest? Certainly they would want the capability to use nuclear, biological, and chemical weapons, with a nuclear capability probably posing the greatest potential threat. How much capability would they need? Not very much . . ."¹¹ In fact, this argument was originally used against the theory that such nations would use missile technology against the United States because missiles are expensive, time-consuming to produce and maintain, and they leave wide footprints which would ensure prompt retaliation. Is it realistic to suppose that these countries do not desire the ability to cause the United States to re-think its interference in what they consider to be their affairs? Probably not, and they probably would willingly pay any sum for the opportunity to play in the deterrence game. Certainly covert terrorist operations provide more bang for the buck, but do not ensure world respect and position as such technologies do. Congressman Curt Weldon points out that the acquisition of ballistic missiles by rogue states "could dramatically cripple US Foreign Policy decisions, forcing

the president to reject a course of action that is in the country's national interests" because it might stay our hand in involving the US in a conflict which could lead to the launching of nuclear, chemical, or biological weapons against the United States.¹² Former Secretary of Defense William Perry said that "the real danger is that those missiles [in the hands of rogues] can be coupled with nuclear, biological or chemical weapons and that they will . . .in the future . . .threaten our country."¹³ The reality of massive retaliation, to the United States, might be small solace to the loss of a major population center. Congressman Weldon also notes that adversaries to the US have evidenced their intents: Qadhafi commented after the 1986 OPERATION ELDORADO CANYON: "...if we had possessed a deterrent, missiles that could reach New York, we would have hit in the same moment. Consequently, we should build this force so that they and others will no longer think about an attack."¹⁴ Likewise, in 1990, Saddam Hussein commented, "Our missiles cannot reach Washington. If they could reach Washington, we would strike it if the need arose."¹⁵ Equally chilling is the assertion by the head of the Palestine Liberation Front that "revenge takes forty years; if not my son, then the son of my son will kill you. Someday, we will have missiles that can reach New York."¹⁶

From these comments, and with some consideration for the list of countries boasting some sort of missile capability, it is apparent that the threat is real, it is possible, and it is one that eventually will become unavoidable. This is not to say that it exists to the exclusion of, or with the imminence of, the terrorist threats against public transportation or offices; but it will become a threat nonetheless, if only because by its very nature the ability to field ballistic missiles gives one a certain cachet or credibility in the

international arena. Some defense will be necessary at some point. The following discussion will address the current capabilities, limitations, and debates concerning the systems for which the ABM treaty is under such heated attack.

Notes

¹ Kalpana Chittaranjan, ISDA, "The ABM Treaty and US NMD", May 1995, available at <http://www.idsaindia.org/an-may8-5.html>

² See, generally, GAO/NSAID-96-225 National Intelligence Estimates B-274120, August 30, 1996, "Foreign Missile Threats Analytic Soundness of Certain National Intelligence Estimates"

³ Ibid., p.6.

⁴ Ibid., p.4.

⁵ Joseph Cirincione, Senior Associate, Carnegie Endowment for International Peace, Presentation to the Conference on Nuclear Disarmament, Safe Disposal of Nuclear Materials or New Weapons Development, Como, Italy, Jul 2-4, 1998

⁶ John F. Sopko, "The Changing Proliferation Threat", Foreign Policy No. 106: 3-20 Spring 1997, p. 4

⁷ Ibid.

⁸ CNN, "US Says North Korea Preparing for New Missile Test", 2 Dec 1998, available at <http://cnn.com/WORLD/asiapcf/9812/02/korea.missile/index.html>

⁹ Ibid.

¹⁰ Senator Jesse Helms, (R-NC), concerning The National Missile Defense Act of 1997 ("The Defend America Act), Senate Republican Agenda, Senate, January 21, 1997.

¹¹ Bruce W. MacDonald, "Missile Defense Prospects", Security Strategy and Missile Defense, edited by Robert L. Pfatzgraff, Jr., McLean, VA< Brassey's Inc., 1996, 126 p. p. 119.

¹² Curt Weldon, "Missile Defense Redivivus Why We Must Act at Once", *Orbis* 4):63-69, p. 64.

¹³ William J. Perry, "Protecting the Nation Through Ballistic Missile Defense" *Defense Issues* Vol.11, no. 37:1-3 1996.

¹⁴ See note 12, *supra*.

¹⁵ Ibid., p. 5.

¹⁶ Ibid.

Chapter 3

Current System Effectiveness



Figure 3. Deploying Patriot Missile System

Despite the ongoing consternation that the Anti-Ballistic Missile Treaty prevents the United States from deploying a national missile defense system, the United States has no system presently capable of meeting any strategic missile threat whatsoever. In fact, all evidence suggests an inability to do so at any time within the next four to nine years,¹ during which time the ABM treaty will be subject to two reviews by the Standing Consultative Committee (SCC).²

When the treaty was originally drafted in 1972, the parties were allowed two sites to establish defensive systems with a 100-interceptor capability. Later treaty modification lowered this to one. The United States system near Grand Forks AFB, North Dakota, was discontinued and abandoned shortly thereafter and no system was put in its place.³

Missile defense technology largely stagnated under both treaty and budgeting constraints. When President Reagan proposed his Strategic Defense Initiative, it was routinely underfunded and disregarded.⁴ Since this time, however, new threats have emerged in an uncertain geopolitical environment, and newer programs have received funding.

New technologies make missile defense the program of choice for force and ally protection for all of the services, resulting in a stampede to abandon the ABM treaty. However, none of the services managed to field a working product, despite the broad agreements pursued by President Clinton in September and the US interpretations put forth by the State Department. None of the six theater systems the current administration worked to preserve by conducting further discussions on the ABM treaty has been even marginally successful in tests. The space systems which outwardly appeared to be in blatant violation of the treaty (Brilliant Eyes/SBIRS) remain largely theoretical and are treaty-compliant if viewed in accordance with stated policy: they were designed for tracking theater ballistic missiles despite the fact that they might technologically be capable of tracking strategic missiles.⁵ To date, the implied treaty violations have not stopped any nation from pursuing its national defense agenda or caused any official inquiry concerning treaty compliance. There are currently no strategic missile defense systems pending testing, and it almost goes without saying that no system will be deployable until at least 2004, by which time the treaty will be up for review again.

Semantics aside, the practical reality is that none of these systems currently tips the scales in favor of abandoning the treaty for a will o' the wisp potentiality. The Patriot missile system, which had an abysmal kill ratio (around 0 for 44 during the Gulf War due to its unforeseen tendency to strike pieces of already-disintegrating missile),⁶ has been re-

adjusted in the PAC-3 system. Certainly, the Patriot PAC-3 systems have done well in tests;⁷ however, the other systems have not had such success. In fact, the test phase of the THAAD has been curtailed due to funding difficulties.⁸ These theater defense programs illustrate the very real problems in anticipating any sort of national system. In order for any system to justify the expense of fielding it for the purpose of deterring rogue missile threats, it must be 100% effective. If effectiveness cannot be guaranteed, the defense fails its primary purpose of defending territory against threats. In addition, any national missile defense program must be able to overcome missiles armed with submunitions or defensive countermeasures. Without the benefit of extensive testing, it is much more difficult to foresee problems of the type faced by the Patriot in the desert, causing the missile system to be a great political success but “technically a total failure”.⁹

The standard interceptor, whether intercepting a strategic or theater-class weapon, works upon a kinetic-kill capability: “hit-to-kill” interceptors. Some of the systems also under development work due to blast fragmentation, using chemical explosives and steel fragments to attack warheads. However, blast fragmentation warhead effectiveness tends to be less effective for the destruction of “hard” missiles than against aircraft and cruise missiles.¹⁰ Basically, upon launch of a ballistic missile, the early warning satellites in geosynchronous orbits detect the exhaust plume of the missile. The satellites provide the military a launch alert and indicate the general direction of the launch. That information is used to cue the defensive sensors to the right spot for tracking. The sensors acquire the target, track the missile and all of its associated decoys, distinguish the actual warhead, and tell the interceptor where to intercept the warhead. The interceptor flies toward the warhead, at some point separating the “kill vehicle”¹¹ from the interceptor. In the

case of kinetic-kill systems, the kill vehicle slams into the attacking warhead and destroys it. The kill vehicle is generally a rod or disk several inches in diameter, which must hit a target often only a meter or so across. If the interceptor is a blast-fragmentation type, it explodes sufficiently close and with sufficient force to destroy the threat. The process, simple in theory, has been likened to “hitting a bullet with a bullet—but at least 10 times faster.”¹²

The technical difficulty of making the interceptor and the warhead meet in the minutes available to them is a colossal task.. When possible countermeasures are added into the equation, it becomes even more difficult.¹³ There are only minutes to intercept the warhead no matter the phase in which the missile is targeted. Furthermore, a warhead may contain several submunitions that result in a host of targets—exceeding the system’s targeting capability. Correctly deployed false targets and real decoys are indistinguishable by current or planned sensor systems until re-entry into the atmosphere. At that point the relative mass will separate them—but by this time it may be too late for the interceptor to discriminate and destroy all targets. Missiles can also be stealthy to radar by relatively inexpensive and simple methods: chaff clouds are immensely effective in narrowing the radar cross section to the size of a honeybee, while shrouding is effective to prevent infrared detection. Obviously, our technologies must also be able to deal with these measures—but in fact the programs have not even undergone successful testing.

Testing the programs is expensive; at over \$10 million per test,¹⁴ costs mount with incredible speed. In the last 15 years, the US conducted 20 hit-to-kill intercepts. In total, six intercepts were successful, but of the thirteen conducted within the last five years,

only three succeeded. The premier system, THAAD, has failed in four intercept attempts.¹⁵ In addition, the tests have not addressed “uncooperative” targets: missiles hidden in chaff, made stealthy, shielded, or disguised with decoys in the upper atmosphere. Current testing relies largely on computer simulation. Developing an effective missile defense even at the theater level is a challenging process. It is exponentially more difficult with faster strategic targets and “uncooperative” countermeasure technology, much of which is relatively simple and inexpensive to initiate.

John Pike, of the Federation of American Scientists, noted that “[a]gainst some conventional threats one might conclude that something was better than nothing. But against weapons of mass destruction, prudent leaders will surely conclude that imperfect defenses of uncertain reliability provide no more comfort than no defense at all.”¹⁶ In fact, the deployment of an inadequate system may invite a peculiar reverse in world military perceptions: “During the Cold War it was often said the United States needed nuclear weapons to offset the conventional superiority of the Red Army—the semi-mythical “Red Horde”. . . [now] it might not be difficult for some of the rogue states to convince themselves that nuclear weapons might be useful to ward off the “Blue Horde”—the conventional forces of the “Sole Remaining Superpower.”¹⁷ Mr. Pike suggests the rogue states will find it no easier to use nuclear weapons than did the United States. The United States has been unpleasantly surprised in the past by underestimating or misunderstanding the motivations of its adversaries, and we cannot judge our adversary on things which the West may find repugnant.

Notes

¹ David E. Mosher, “The Grand Plans”, *IEEE Spectrum* 34:28-39 Sep 1997, pp. 33, 38-39; see also Joseph Cirincione, “The Persistence of the Missile Defense Illusion”, presentation to the Conference on Nuclear Disarmament, Safe Disposal of Nuclear Materials or New Weapons Development, July 1998, n.p., available at <http://www.ceip.org/programs/npp/bmd.htm>.

² Article XIV, Treaty Between the United States of America and the Union of Soviet Socialist Republics on the Limitation of Anti-Ballistic Missile Systems, 1972

³ Peter D. Zimmerman, “Missile Defense and American Security A Sensible National Policy”, *Defense Working Paper No. 2*, n.p., May 1996.

⁴ Curt Weldon, “Why We Must Act at Once”, *Orbis* 40:65-66; see also, Joseph Cirincione, “The Persistence of the Missile Defense Illusion”, p. 12 (note 1, *supra*)

⁵ George Lewis and He Yingbo, “U.S.Missile Defense Activities and the Future of the ABM Treaty”, Proceedings of the USPID-VII International Castiglioncello Conference on Nuclear and Conventional Disarmament: Progress or Stalemate, alleging that but for the US political “spin” the systems would be treaty-violative; on the actual operability of the systems, see generally Joseph Cirincione, *supra*.

⁶ George N. Lewis & Theodore Postol, “Future Challenges To Ballistic Missile Defense”, *IEEE Spectrum* (September 1997) p. 68. The authors note that although the PAC 2 systems used in the Gulf had perfect test records (17/17); the al-Husayn missile used by Iraq was prone to breakup at about 10km altitudes, plunging down and piraling into the atmosphere, “while pieces of material would be breaking off its body, unpredictably changing its aerodynamic behavior. . .apparently a complete surprise to the defenders. . .early in the war pieces of debris from the disintegrating al-Husayns were fired upon by Patriots, wasting large numbers of interceptors on single attacking missiles. . .approximately 30% of the Patriots were fired at debris”. Further, leaking electronic signals from other military equipment into the Patriot’s radar “triggered an additional 15% of the interceptors to be fired into empty air, when no targets were present.”

⁷ Lewis and Postol, “Future Challenges to Ballistic Missile Defense” *IEEE Spectrum*, (Sep 97) p. 60.

⁸ Mosher, David E., “The Grand Plans”, *IEEE Spectrum* (Sep 97) p. 39

⁹ Missiles already in a breakup stage were identified by the defensive system to be several missiles, and the Patriots launched at what was in fact a particle of a disintegrating warhead, not the missile itself: see Lewis and Postol, “Future Challenges to Ballistic Missile Defense” *IEEE Spectrum* (Sep 97) p. 60.

¹⁰ Mosher, David E., “The Grand Plans”, *IEEE Spectrum* (Sep 97) pp. 28-39.

¹¹ The “kill vehicle” is the front end of the interceptor that will “see” the target and destroy it by colliding with it, outside the atmosphere. GAO/NSIAD-98-153, *National Missile Defense: Even With Increased Funding Technical and Schedule Risks are High*, Letter report, p.2, 23 June 98.

¹² Ibid., p. 33.

¹³ Lewis and Postol, “Future Challenges to Ballistic Missile Defense”, *IEEE Spectrum* (Sep 97) pp. 62-66.

¹⁴ Mosher, David E., “The Grand Plans” *IEEE Spectrum* (Sep 97)p. 38.

¹⁵ Ibid., p. 39.

Notes

¹⁶ Pike, John, *Clever Politics in the Service of Bad Policy*, Federation of American Scientists Public Interest Report, Vol 49, No. 5, Sep/Oct 96, n.p; available at <http://www.fas.org/faspir/pir0996.html>.

¹⁷ Ibid.

Chapter 4

The Controversy



Figure 4. Missile Launch.

The controversy surrounding the ABM treaty is multi-faceted. Not only is the status of the treaty itself as a legally binding agreement in dispute, but also the differing opinions of the Executive Branch, the Congress, the Department of Defense, and the Russians serve to confuse the contextual situation in which the ABM treaty's validity must be evaluated.

The Lawyers

The ABM treaty is under heavy fire on the most basic level by the powerful Heritage Foundation, which commissioned a special study from a prominent law firm which concluded that our legal obligations under ABM treaty ended with the dissolution of the

Soviet Union.¹ The study largely concluded that because the four states with whom the new agreements were formed could not perform the duties of the treaty under its original terms, and the “successors” could not continue their predecessor’s international legal personality.² The study noted, *inter alia*, that there were fourteen former Soviet republics, but only four of them were new signatories to the treaty. This resulted in a significant drop in the territory covered by the treaty. In addition, it allowed the remaining states the right to deploy ABM systems in their own territory. Since the US essentially “traded away the right to defend its territory for the right to “access” any and all of the Soviet Union’s territory”³, the review suggests that the loss of territory is a significant change affecting the basic premise of the agreement. Further, the legal review noted that non-included states have “ABM Treaty related assets on [their] territory”⁴ and therefore the stated Executive Branch goal of making Treaty successors of states having such related assets is somewhat incongruous with the actual state of affairs. In short, the commissioned study found the attempt to multilateralize the treaty in this fashion was legally insupportable. The brief acknowledged that the White House’s Office of Legal Counsel came to a largely inconclusive opinion suggesting that the succession memorandum was not a substantive change, but in any case should be subject to the ratification process. These legal arguments have not affected the basic controversy, as the concerned interests continue to compete with each other with full regard to the ABM treaty.

The Pentagon

The Department of Defense is uncharacteristically reticent to abrogate the treaty. Paul G. Kaminsky, Undersecretary of Defense for Acquisition and Technology, stated

before the House National Security Committee in 1997 that the US defense strategy had three components: preventing and reducing the threat, deterring the threat, and defending against the threat.⁵ He noted that the DoD was considering proposals on systems against ICBMs or strategic ballistic missile systems with due consideration to the treaty, but stressing that the development portion of the program would comply with the Anti-Ballistic Missile Treaty and enable the US to develop a system that could be deployed within three years of a deployment decision. It is readily apparent, however, that there is still a firm belief in the necessity of the deterrence and cooperation options. The DoD has continued to be strongly supportive of the Clinton administration's "3+3" program. General John Shalikashvili, when Chairman of the Joint Chiefs, stated, "efforts which suggest changes to or withdrawal from the ABM Treaty may jeopardize Russian ratification of START II and . . . could prompt Russia to Withdraw from START I . . . thereby increasing both the costs and risk we may face."⁶ Noting that the treaty provides for a right of withdrawal with six months' notice for matters of "supreme national interest," Secretary of Defense William Cohen stated in a 1999 news conference that he would prefer that the ABM treaty be preserved to discourage the spread of offensive missiles.⁷

The Congress

The Republican Congress firmly supports the establishment of both theater and national missile defense systems.⁸ There are two major camps of missile defense advocates: those who wish to immediately deploy a national missile defense system, and those who support the "3+3" initiatives currently underway. Ironically, although the Heritage Foundation commissioned study conclusions appear to be congruent with the

desires of a large part of Congress, the basic validity of the treaty itself has been assumed in Congressional discussions and legislation. For instance, the 1995 hearing on the requirements for ballistic missile defense in accordance with proposed amendments to the 1991 Defend America Act, as well as the debate concerning the proposed 1998 Missile Protection Act,⁹ made express assumptions that the Anti Ballistic Missile Treaty was a problem with which need to be addressed in order to fully advance the legislated national missile defensive systems¹⁰ Hawkish legislators are concerned that “what had been viewed as a threat which could occur 8 or 9 years in the future, now. . .could be fielded some 7 or 8 years earlier than had been anticipated as recently as a year ago.” For example, Mississippi Senator Thad Cochran noted that one year ago the US assessed Pakistan with a ballistic missile capability of 300km. Six months later, Pakistan tested a missile “with five times the range of what was said to be in their arsenal back in November, 6 months ago.”¹¹ Congress’ impatience with the Treaty, the discomfort with the admission of the Director of Central Intelligence that foreign ICBM missile capabilities could only be predicted with uncertainty,¹² and the delays in deploying a national missile defense system is evidenced in the recent activities of certain senior members. In a letter to the President dated 5 Oct 97, a select group of legislators including Senate Majority Leader Trent Lott (R-MS) and Senate Foreign Relations Committee Chairman Jesse Helms (R-NC) denounced President Clinton’s acts in executing memoranda of understanding between Belarus, Kazakhstan, Russia, and Ukraine, naming them successor states to the USSR for purposes of the treaty, and demanding that the MOUs or similar agreements be submitted to the Senate for approval¹³

The Russians

The USSR has previously conditioned its approval of arms reduction treaties upon the continuation of the ABM treaty, and in fact this trend seems likely to continue. After President Clinton told Russian President Boris Yeltsin in a January 1999 letter that he wished to discuss changes to the ABM treaty, the Russian press touted this as evidence that the United States intended to become the new hegemon and that ABM treaty modification was but one step in the process.¹⁴ CNN noted that one front page headline accused the United States of instigating a new arms race, an opinion supported by Foreign Minister's Igor Ivanov's refusal to amend the ABM treaty.¹⁵

Former Russian Ambassador Yuri Nazarkin, a former START negotiator, stated that although there was "certainly no juridical linkage between the two, there definitely is linkage in a political and military sense."¹⁶ In a panel discussion concerning START II, Missile Non-Proliferation, and Missile Defense, the former ambassador opined that the major arguments against the treaty were essentially myths: the treaty is obsolete as a product of the Cold War; and that it could be amended to permit deployment of national missile defense. Also, he noted that the change to a multi-polar world makes the continued efficaciousness of the Mutual Assured Destruction policy questionable and reminded panelists that the strategic relationship between US and Russia can be maintained despite of the new world realities. Mr. Nazarkin opined that the danger of missile proliferation by third countries is exaggerated, and that it could be neutralized through non-proliferation strategies. He strongly cautioned against even an ABM system for limited attack—which would concern Russia as a system ripe for expansion.¹⁷ Ambassador Nazarkin's points, which should be heeded in today's environment, stress

that the ABM Treaty is not the result of the Cold War, but of détente, and that (in coincidental agreement with the position of the Clinton White House) the treaty is a cornerstone of the Soviet/Russian-American strategic relationship.¹⁸ His assertion that amendment of such a treaty to allow things which are now prohibited is ridiculous is well taken--while, admittedly “mutual assured safety sounds much better than mutual assured destruction,” one must continue the strategic balance as long as nuclear deterrence is still important. Although Mr Nazarkin concedes Russia is not the superpower the USSR was, it still maintains a large strategic arsenal, and although much of the adversarial relationship has dissipated, the nuclear weapons are, “for the time being, the basis of stability.” And lastly, noted the former ambassador, at this point in time the Russian position would consider the danger from third countries to be exaggerated, and that even an ABM system against limited attacks would be a concern for Russia.¹⁹ The US should heed the Ambassador’s reminder that Russia has “certain nationalist extremists who would be happy to see Russia develop closer military relations with Iran, Iraq, and some other countries.”²⁰ This, of course, is a continuing concern to the United States.

Notwithstanding the US intelligence estimates of possible Soviet responses (which would probably be no less to similar initiatives under the current government) to the old Strategic Defense Initiative, it seems to suggest that relegating the ABM treaty to the dustbin of history is premature.

In large part, the Russian position is congruent with the position of the supporters of the ABM Treaty or a similar preventative treaty: in worrying about a national missile defense program and how to initiate it in the shadow of the ABM treaty, “we’re worrying about the least successful, the least promising avenue of dealing with [the] ballistic

missile problem, when we're having such tremendous success with the most promising one, namely the relationships that we have established with Russia.”²¹ Arguably, it is also to Russia’s advantage to have an additional fetter on US capabilities, since Russia no longer has the equivalent power.

The President

In the wake of President Reagan’s underfunded and apparently underappreciated plans for the Strategic Defense Initiative programs, the Clinton Administration proposed the “3+3” plan for missile defense. The plan mandated continued research and development on a national missile defense until the year 2000, after which time a threat assessment would be made. If the threat warranted a deployment decision, the decision would be made with the expectation that a national missile defense system would begin operation three years later. If the threat does not justify deployment of national systems, the research and development would continue, with the capability to deploy within three years after a deployment decision. This administration is trying to strike a balance between the desire to protect the ABM treaty, something the Russians consider necessary to continued non-proliferation activities, the desire to preserve nuclear arms reductions with Moscow, and the necessity to manage the constant pressure from the conservative Republican Congress to make a firm commitment to missile defense.²² The agreements in the wake of March and September summits of 1997 attempted to bridge the issues and cobble together a solution: the agreements sought to sustain the ABM treaty’s central objective of severely limiting NMD systems, but delay the final resolution of the demarcation between high performance theater missile defense and national missile defense systems.²³ The agreements did this essentially by allowing anything called a

“theater missile defense” (except space based interceptors)—even though it may have significant capabilities against strategic-class missiles. The limitation provision specifies only that such systems not be tested against a target traveling at greater than 5 km/sec (see, e.g., Chapter 3, Current Systems, *infra*). With these modifications to the ABM pact, the current 3+3 systems are fully attainable, and the discussions concerning complete withdrawal from the treaty have thus been adroitly postponed.

The White House agreed to send the MOUs to the Senate for approval, but only after the Russian Duma ratifies the START II treaty. This strategy seems wise in view of the stated Russian perspective concerning the interrelationship between the START II and ABM treaties.²⁴

Notes

¹ *The Collapse of the Soviet Union and the End of the 1972 Anti-Ballistic Missile Treaty*, a legal review commissioned by the Heritage Foundation, note 26, n.p. June 15 1998.

² David Rivkin et al., *The Collapse of the Soviet Union and the End of the 1972 Anti-Ballistic Missile Treaty*, note 26, n.p. June 15 1998.

³ Ibid.

⁴ Ibid.

⁵ Paul G. Kaminsky (Deputy Undersecretary for Acquisition and Technology) “DoD’s Ballistic Missile Defense Programs” *Defense Issues* 12, No. 14: 1-8,1997 [online: <http://www.dtic.mil/defenselink/pubs/di97.di1214.html>].

⁶ John Shalikashvili, *letter to the Hon. Sam Nunn, U.S. Senate, Committee on Armed Services, 1 May 1996*, reprinted in Congressional Record p. S4622, May 1998.

⁷ Associated Press. “Pentagon to Press for Treaty Change to Allow Missile Defenses” *CNN*, January 22 1999.

⁸ Jack Mendelsohn, “Missile Defense” *Issues in Science and Technology Online*, n.p. Fall 1998.

⁹ American Missile Protection Act Of 1998--Motion To Proceed. Senate - May 11, 1998.

¹⁰ See, generally, Requirements for Ballistic Missile Defenses, Hearing before the Senate Committee on Armed Services, 104th Congress, First session, Jan 24,1995.

¹¹ Ibid., S4618.

¹² Ibid.

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¹³ Associated Press. "Gingrich, Republicans Slam Clinton-Yeltsin Pact", *CNN Allpolitics Online*, March 24, 1997 [online]:

<http://cnn.com/ALLPOLITICS/1997/03/24/gop.armsdeal/>

¹⁴ Reuters. "Russian Papers Attack U.S. Anti-Missile Proposal", *CNN*, 22 January 1999.

¹⁵ Ibid.

¹⁶ Ambassador Yuri Nazarkin, presentation to Panel III: The Role of the ABM Treaty and National Missile Defense, n.p.[online:

<http://wheat.symgrp.com/symgrp/pai/articles/panel3.html>]

¹⁷ Ibid.

¹⁸ Ibid.

¹⁹ Ibid.

²⁰ Ibid.

²¹ John Pike, Federation of American Scientists, comments to Panel III: The Role of the ABM Treaty and National Missile Defense, n.p. .[online: <http://wheat.symgrp.com/symgrp/pai/articles/panel3.html>]

²² Spurgeon M. Keeny, Jr., *The Next Step in Strategic Arms Control*, September Focus, n.p., 2 Feb 98.

²³ Ibid.

²⁴

Chapter 5

Conclusions



Figure 5. Nuclear “Mushroom” Cloud.

I do not know with what weapons World War 3 will be fought, but World War 4 will be fought with sticks and stones.

A. Einstein

Withdrawal from the ABM treaty is premature, given the current geopolitical environment. While the question of whether or not the named successors will be allowed to undertake the rights and obligations of the Soviet Union remains to be determined when the Clinton/Yeltsin September agreements are submitted to the Senate, the current situation suggests that it would be prudent to maintain such agreements with Russia at the very least. Although the Soviet Union has been dissolved for some time now, the military, economic, and political situations are continually in flux. Russia is unprepared to undertake another expensive arms race, and is still a formidable challenge from the

perspective that they maintain a large arsenal of nuclear weapons and delivery systems which still constitute a threat. As noted, the Russian press is skeptical of US motives; this attitude is echoed by the Foreign Minister and other Russian dignitaries. On the other hand, the new signatories have accomplished a workable alternative by virtue of the accords: while some detractors allege that the agreements emasculate the spirit of the treaty, in fact the agreements permit the United States the technical latitude it needs to continue the 3+3 program within acceptable political parameters. As long as deterrence of the continuing Russian nuclear threat remains a national objective, the ABM treaty remains a force with which to be reckoned. It seems unusual to avoid the actual legalities of the document and the MOU that the President sought and completed with some of the remaining nuclear states, but the United States has *de facto* accepted the treaty and has spent a good deal of time ensuring colorable compliance with its terms—a somewhat ironic state of affairs if the parties do not believe the agreement to be binding. Unilateral removal from the treaty could have immediate effects upon our negotiations in related matters with the Russian Federation.

Former Air Force Chief of Staff General Ronald Fogelman stated that the question of national missile defense for America is “when, not whether.”¹ He emphasized the importance of the US pursuing missile defense technology, as well as the current administration’s 3 +3 program, which anticipates using the site available to the US at Grand Forks under the treaty for deployment within three years after the requisite finding of national necessity.² Although the US has made significant strides since his 1996 comments, we remain unprepared to deploy a system of the required effectiveness within three years, and thus can continue to seek such a standard.

There is no practical problem with the US continuing its efforts on its tactical systems, which, although more developed than any potential strategic defense system, still exhibit no proven effectiveness. Current systems have been certified as treaty-compliant.³ Defense Working Paper #2, Missile Defense and National Security Strategy, noted “unless extremely capable interceptors can be built and fielded,” numerical simulations show that even with two interceptors dispatched against every attacking warhead, and using interceptors with a single shot kill probability of greater than 0.7, there remains at least a 40% probability that the defense will get no more than nine of every 10 incoming missiles.⁴

Even our nation’s best technology is currently inadequate to address any threat posed in the international environment by ballistic missiles, and we have little to gain by sacrificing our relations with Russia and the successor states by unilaterally withdrawing from our understandings concerning the treaty at this point. It could seriously jeopardize the current US diplomatic and political efforts to meet real and immediate threats, for questionable gain. Abrogation of the treaty at this point is untimely. The treaty is not now preventing us from exercising any technology that we are currently prepared to field or test, nor is it actively impeding our efforts for lower-tier programs which may at a later date be appropriate for further investigation or even information-sharing with the successors and the big nuclear states. The threat of such massive power enabled us to maintain a relatively stable if uneasy bipolar peace, but of course this situation cannot be expected to continue indefinitely.

A far more reasonable solution to deal with the issue is to toe the current line—keeping the peace with Russia and necessary successor states, and at the same time

developing those technologies that are currently available to us under our stated interpretation of our obligations of the treaty. The treaty is subject to review every five years: the next review should be in 2003—roughly the same time the best-guess projections suggest that any sort of national defense is possible. Since the US is entitled to the one site, it would be in its best interests to take the situation step-by-step, ensuring the technologies are available and successful before worrying about area coverage. Testimony before the 1996 House Government Reform and Oversight Subcommittee on National Security⁵ advocated deferring, for a time, the question of US withdrawal from the ABM treaty. R. James Woolsey, former CIA Director, pointed out that the advisors to the Russian president were sympathetic to US adversaries, and US interests are not served by inventing points of contention with the former Soviet bloc countries.⁶ In this he is correct, and US national interests would be best served by continuing BMD programs, seeking new accords in WMD destruction and control, and seeking withdrawal or modification at some future date if it becomes necessary.

In conclusion, it appears that the legality of the treaty as binding upon the US in the wake of Soviet dissolution is questionable, and that we have been operating as if we consent to be bound. Furthermore, we have not made use of the site permitted us under the treaty. We have not fully engaged the technologies for successful TMD programs. Considering the technical difficulty of these programs even on simple principles of physics and ballistics, and multiplying that difficulty factor by necessitating a discrimination capability to deal with readily available and relatively uncomplicated counter-detection measures, the idea of withdrawing from a treaty that does not currently prevent us from doing anything we have the current capability of doing seems somewhat

thoughtless. The stakes we have with the former Soviet Union countries in nonproliferation issues, ballistic missiles, missile technology control, and similar agreements to contain a threat and a distrust that is still too real to discard in misplaced complacence.

Notes

¹ Ronald R. Fogleman (Gen, USAF). “National Missile Defense Program: When, Not Whether.” *Defense Issues* Vol. 11, No. 48:1-4 1996 [online: <http://www.dtic.mil/defenselink/pubs/di96/di1148.html>]

² Ibid.

³ First Agreed Statement of Sept 26 1997 Relating to the ABM Treaty [available online: <http://www.acda.gov/factshee/missdef.first.htm>]

⁴ Peter D. Zimmerman, “Missile Defense and American Security A Sensible National Policy”, *Defense Working Paper No. 2*.

⁵ R .James Woolsey, Testimony before the House Government Reform and Oversight Subcommittee on National Security, 30 May 1996.

⁶ Ibid.

Appendix A

Appendix A Ballistic Missile-Capable Countries

This chart is adapted from the forthcoming *Tracking Nuclear Proliferation 1998* (July 1998, Carnegie Endowment for International Peace). It lists the countries, other than the five nuclear powers, that have operational ballistic missiles with range capabilities over 100 kilometers. Although some countries have demonstrated the ability to use surface-to-air missiles in a surface-to-surface role, these systems are not listed unless they are deployed as dedicated ballistic missiles such as China's CSS-8. Range is given in kilometers and payload in kilograms

COUNTRY	SYSTEM	STATUS	RANGE/ PAYLOAD	ORIGIN	NOTES
Afghanistan	Scud B	O	300/1000	USSR	
Algeria	Scud-B	O	300/1000	USSR	
Armenia	Scud-B	O	300/1000	Russia	
Azerbaijan	Scud B	O	300/1000	USSR	
Belarus	SS-21	O	70-120/480	USSR	
	Scud-B	O	300/1000	USSR	
Bulgaria	Scud B	O	300/1000	USSR	
	SS-23	O	500/450	USSR	Banned by INF Treaty
Czech Republic	SS-21	O	70-120/480	USSR	
Egypt	Scud-B	O/U	300/1000	USSR	
	Project T	O	450/1000	I/DPRK	
	Scud Mod C	O	500/700	DPRK	
Georgia	Scud B	O	300/1000	USSR	
India	Prithvi-150	O	150/1000	I/USSR	From Russian SA-2
	Prithvi-250	D/T	250/500	I/USSR	From Russian SA-2
	Prithvi 350	D	350/500	I/USSR	From Russian SA-2
	Agni	D/T	2000/ 1,000+	I/US/France	From Scout
	Sagarika	D	300/500	I/Russia?	From Prithvi/SA-2
	Surya	D	12,000/?	I	From PSLV
Iran	Mushak-120	O/U?	120/500	I/PRC?	
	Mushak-160	O/U?	160/190	I/PRC?	
	Mushak-200	O/U?	200/500	I/PRC?	
	CSS-8	O	150/190	PRC	Mod SA-2
	Scud-B	O/U	300/1000	Libya	
	Scud Mod B	O/P	300/1000	DPRK	
	Scud Mod C	O	500/700	DPRK	
	Zelzal-3	D	1000-1500/1000	I/?	
	Tondar 68	D	1000/500	I/PRC?	Chinese M-18?
	Shahab-3	D	1300/700	I/DPRK	from Nodong?
	Shahab-4	D	2000/1000	I/Russia	Russian SS4
Iraq	Ababil-100	P	100-150/300	I	
	Al-Samoud	P	150/?	I	From Scud
	Scud B	Hidden?	300/1000	USSR	

	Al Hussein	Hidden? 600-650/500	I	From Scud
	Al Hijarah	Hidden? 600-650/250?	I	From Scud
Israel	Lance	O/S 130/450	US	MOU
	Jericho I	O 500/500	France	
	Jericho II	O 1500/1000	France/I	
	Jericho III	D 2500/1000	I	
Kazakhstan	SS-21	O 70-120/480	USSR	
	Scud B	O 300/1000	USSR	
Libya	Scud B	O/U 300/1000	USSR	
	Al Fatah (Ittisalt)	D/T 950/500	I/?	
North Korea	Scud Mod B	O/P 300/1000	USSR	
	Scud Mod C	O/P 500/700	I	
	Nodong	D/T 1000/700-1000	I	
	Taepo Dong 1	D 1500+/1000	I	Nodong + Scud
	Taepo Dong 2	D 4000-6000/1000	I	
Pakistan	M-11	S 280/800	PRC	
	Hatf 1	O 80/500	I/France?	
	Hatf 1A	O 100/500	I/France?	
	Hatf 2	D 280-300/500	I/PRC?	M-11 derivative?
	Hatf 3	D? 600/500	I/PRC?	M-9 derivative?
	Ghauri (MK-III)	D 1500/500-750	I	
Poland	SS-21	O 70-120/480	USSR	
	Scud B	O 300/1000	USSR	
Romania	Scud B	O 300/1000	USSR	Unilateral?
Saudi Arabia	CSS-2/ DF-3	O 2650/2150	PRC	Non-nuclear
Serbia	K-15 Kraijina	D 150/?	I	
	Scud mod	D 400/700	???	
South Korea	Nike-Hercules-1	O 180/300	U.S./I	Mod SAM
	Nike-Hercules-2	D 250/300	U.S./I	Mod SAM
Slovakia	SS-21	O 70-120/480	USSR	
	Scud B	O 300/1000	USSR	
	SS-23	O 500/450	USSR	Banned by INF Treaty
Syria	SS-21	O 70-120/480	USSR	
	Scud B	O 300/1000	USSR	
	Scud Mod C	O 500/700	DPRK	
	M-9	D? 600/950	PRC?	
Taiwan	Ching Feng	O 130/400	I/Israel?	Green Bee
	Tien Ma	D? 950/500	I/?	Sky Horse
	Sky Spear	D 300/?	I	Mod SAM
UAE	Scud B	O 300/1000	Russia?	
Ukraine	SS-21	O 70-120/480	USSR	MOU
	Scud B	O 300/1000	USSR	
Vietnam	Scud B	O 300/1000	USSR	
Yemen	SS-21	O 70-120/480	USSR	
	Scud B	O/U 300/1000	USSR	
Zaire	Scud B	O 300/1000	DPRK	

Abbreviations:

Status	Country of Origin
D: Development	I: Indigenous
O: Operational	
P: Production	
S: Storage	
T: Tested	
U: Used	

Notes

MTCR: Member of Missile Technology Control Regime
 Unilateral: Unilateral Commitment to MTCR
 MOU: Memorandum of Understanding on adherence to MTCR
 SAM: Surface-to-air missile
 Mod SAM: SAM modified for use as a ballistic missile
 From SAM: ballistic missile based on SAM technology

SOURCE: Cirincione, Joseph. The Persistence of the Missile Defense Illusion, presentation to the Conference on:
Nuclear Disarmament, Safe Disposal of Nuclear Materials or New Weapons Development?
Como, Italy, July 2-4, 1998. Available online: <http://www.ceip.org/programs/npp/bmd.htm>

Glossary

AirBorne Laser	A theater anti-missile system relying on a chemical laser to either destroy or overstress a missile (causing fatal structural failure)
ballistic missile	Self-propelled missiles guided in the ascent of a high-arch trajectory and freely falling in the descent
ICBM	Intercontinental Ballistic Missile. A missile capable of travelling between 5,000 and 13,000 km
laser	Any of several devices that convert incident electromagnetic radiation of mixed frequencies to one or more discrete frequencies of highly amplified and coherent visible radiation.
microwave	Any electromagnetic radiation having a wavelength in the approximate range from one millimeter to one meter, the region between infrared and shortwave radio wavelengths.
radar	A method of detecting distant objects and determining their position, velocity, or other characteristics by analysis of very high frequency radio waves reflected from their surfaces.
rogue state	A country which does not conform to international norms and may not be deterred by the treat of conventional or nuclear retaliation.
strategic ballistic missile (ABMT agreement)	A missile with a range greater than 3,500 km and entry speeds greater to 5km/sec.
theater ballistic missile (ABMT agreement).	A missile with a range less than 3,500 km and entry speeds equal to or less than 5km/sec

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